

## NEW RECORDS OF TANTULOCARIDA, PARASITES OF MARINE CRUSTACEANS, FROM SCOTTISH WATERS.

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### ABSTRACT

The Tantulocarida is a small group of minute enigmatic parasitic crustaceans. They live as ectoparasites on other crustaceans such as copepods, ostracods, cumaceans, isopods, tanaids, or amphipods. They are relatively poorly known with only about 20 species described so far. Tantulocarids have mainly been found on deep water crustaceans, but they also occur in shallow waters. Three species have been described from deep waters of the Rockall Trough (2-3000m), which lie around 2-300km west of Scotland. The present paper highlights new records of three species from relatively shallow Scottish waters, collected during routine environmental monitoring surveys over a number of years. These species are *Microdajus langi* Greve, 1965, *Amphitantulus harpiniacheres* Boxshall & Vader, 1993, and probably *Cumoniscus kruppi* Bonnier 1903. Some additional new records from Belfast Lough and off the Northumberland coast are also noted.

### INTRODUCTION

The Tantulocarida is a small group of minute enigmatic parasitic crustaceans. They live as ectoparasites on other crustaceans such as copepods, ostracods, cumaceans, isopods, tanaids, or amphipods. They are relatively poorly known with only about 20 species described so far. Although first observed over 100 years ago, most have been discovered in recent years. They were originally regarded as aberrant parasitic isopods or copepods but their status as a distinct class of crustacean was recognised around 20 years ago (Boxshall & Lincoln, 1983). They have a most unusual complex life cycle which has only recently been elucidated. This involves a parasitic phase which may involve asexual (parthenogenetic) reproduction, as well as dispersive phases of free swimming larvae or sexual males and females (Boxshall & Lincoln, 1987).

The tantulus larva is about 0.1mm long and comprises a shield shaped head and a six-segmented trunk with tiny legs and a short tail region. It adheres to its host with an anterior attachment disc and subsequently a large brood sac emerges from the larval trunk attaining a length of around 1mm. It is at this stage the tantulocarid is most conspicuous. Developing within the brood sac are either a single large sexual male or female or, in parthenogenetic females, numerous eggs which subsequently hatch into additional tantulus larvae (Huys, Boxshall, & Lincoln, 1993).

Most records of tantulocarids have been accidental finds of parasitic stages in the course of surveys of crustaceans. However, free swimming stages have occasionally been recovered as temporary members of the meiobenthos communities (Huys, Andersen & Kristensen 1992).

So far, tantulocarids have mainly been found on deep water crustaceans, but they do also occur in shallow waters. Three species have been described from deep waters of the Rockall Trough (2-3000m), which lie around 2-300km west of Scotland. Two of these were attached to tanaids, namely *Microdajus gaelicus* Boxshall & Lincoln, 1987 on *Typhlotanias pulcher* Hansen, and *Microdajus pectinatus* Boxshall, Huys & Lincoln, 1989 on an undescribed *Typhlotanias* sp. The third species, *Deoterthron harrisoni* Boxshall & Lincoln, 1987 was found on the isopod *Macrostylis magnifica* Wolff. Only a single species, *Microdajus langi* Greve, 1965 is so far known to occur in Scottish coastal waters where it parasitizes various species of tanaid.

The present paper highlights new records of three species from relatively shallow Scottish waters, collected during routine environmental monitoring surveys over a number of years. Some additional new records from Belfast Lough and off the Northumberland coast are also noted.

### RESULTS

#### *Microdajus langi* Greve, 1965

1 parthenogenetic female and 3 tantulus larvae attached to the tanaid *Akanthophoreus gracilis* (Kroyer, 1842) collected 26<sup>th</sup> April 1989 at Bell Rock sewage disposal grounds (Stn.17, 56°25.00'N, 02°06.38'W, depth 64m), about 13km east of Bell Rock, Forth Sea Area. This material is deposited in the British Museum (NH), London.

1 parthenogenetic female, with developing eggs (Figure 1) attached to *Akanthophoreus gracilis* (Kroyer, 1842) collected 3<sup>rd</sup> August 2001 at South Shian (SEPA Stn. 4, 56°31.274'N, 05°23.871'W, depth 7m), Loch Creran, West Scotland.

Deposited in National Museum of Scotland (NMSZ:2006.015.0001).

*Microdajus langi* is widely distributed in coastal waters. The original description by Greve, 1965 is from Raunefjorden, Norway at 120-130m depth on the tanaids *Leptognathia breviremis* (Lilljeborg), and *Typhlotanias aequiremis*. It was recorded by Boxshall & Lincoln (1987) from Cumbrae, Firth of Clyde, on a juvenile tanaid, at 113m depth, and in the Lynn of Lorne, Loch Linnhe, on *Leptognathopsis attenuata* Holdich & Bird at only

22m depth. Grygier & Seig (1988) observed it on *L. breviremis* from Gullmarfjord, Sweden, and Greve (1988) provided further records from Norway. The new scottish record from Loch Creran is close to the earlier find from Lynn of Lorne but on a different tanaid host and in even shallower water.

During preparation of this paper further specimens of *M. langi* were received for examination. These were all from *A. gracilis* and included a single tantulus larva, attached to the host gnathopod, collected from Belfast Lough (EHS Stn.F1, 54°42.19'N, 05°35.54'W, depth 24.4m). Five parasitized taniads were recovered from off the Northumberland coast in 2002 and 2003 at, or close to, Stn.M1(=Stn.27), approx. 55°04.50'N, 01°15.00' W, depth 55m, Dove Marine Lab, Cullercoats, see Buchanan *et al.* (1978). These comprised: i) 1 taniad with 3 tantulocarids - 2 with single developing sexual female in brood sac, and 1 parthenogenetic female, with developing tantulus larvae in brood sac, all attached dorsally; ii) 2 taniads each with 1 parthenogenetic female tantulocarid attached dorsally with developing tantulus larvae in brood sac; and iii) 2 taniads with 1 parthenogenetic female, attached at base of gnathopod, with numerous developing tantulus larvae in large brood sac, (latter shown in **Figure 2**). The Northumberland specimens are deposited in the National Museum of Scotland (NMSZ:2006.015.0002-4).

#### ***Amphitantulus harpiniacheres* Boxshall & Vader, 1993**

7 tantulocarids which included 1 tantulus larva, and 6 with brood sacs all attached to a single juvenile amphipod, *Harpinia antennaria* Meinert, 1890 (**Figure 3**) collected in February 2000 at 107m depth, 2.5km north of the Miller Platform (58°44'N, 01°24'E). The tantulocarids with brood sacs each have a single developing sexual adult curled up inside (**Figure 4**). The number of pairs of developing legs discernable (around 6) indicates these are males, rather than sexual females, which only have 2 pairs.

However, the head shield and body trunk, with legs and tail, of the preceding larval stage are still evident (**Figure 5, 6**). The amphipod *H. antennaria* may attain an adult length of around 5mm. The number of tantulocarid parasites on this juvenile, only about 1mm long, must represent a significant burden.

It is surprising that the existence of this species has been overlooked until quite recently. The host *H. antennaria* is widely distributed in relatively shallow coastal waters and frequently occurs in benthic monitoring surveys. The type description is from the MIME field, in the central northern North Sea, about 300km east of Aberdeen (but 5km inside the norwegian sector) at 80m depth. Boxshall & Vader observed 64 infested *H. antennaria* with a total of 216 tantulocarids. The new scottish material was collected about 200 km further north, and about 300km east of John O'Groats and just 5km inside the British (Scottish!) sector boundary. This appears to be the first record within british territorial waters. The parasitized amphipod is deposited in the National Museum of Scotland (NMSZ:2006.015.0005).

#### **?*Cumoniscus kruppi* Bonnier 1903**

1 tantulus larva with developing adult (male?) in brood sac attached to carapace of the cumacean *Diastylis lucifera* collected in the Minches, on the west coast of Scotland sometime in the late 1980s. The specimen was shown to the author by a colleague at a taxonomic workshop in 1990. Unfortunately the specimen was lost prior to a more detailed examination. The identification is tentative and based solely on the fact that *C. kruppi* is the only tantulocarid known to occur on a cumacean host. The record is mentioned here to alert benthic ecologists to its presence in Scottish waters in the hope that further specimens might come to light. However, over 660 *D. lucifera* collected from the St. Abbs disposal grounds in the Firth of Forth, between 1986 and 1989, have been examined by the author without any tantulocarids being observed.

*C. kruppi* was originally described from near the Isle of Capri in the Mediterranean on an unidentified leuconid cumacean, collected at 1100m depth. A single specimen of this species was rediscovered in the Bay of Biscay at 307m depth, by Huys, Boxshall & Casanova (1993), attached to an apparently new genus of leuconid cumacean.

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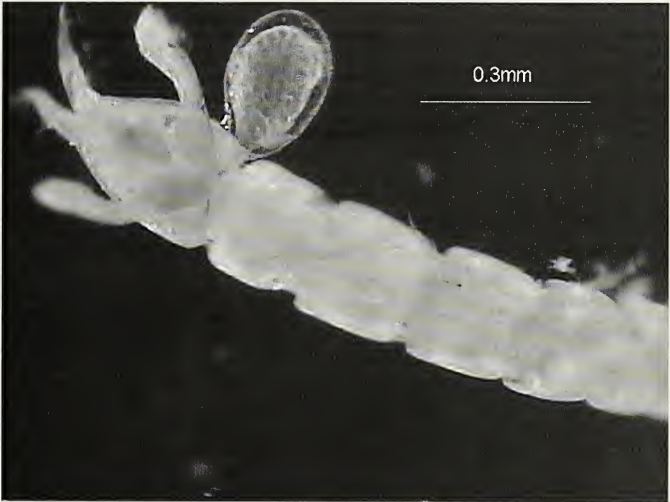
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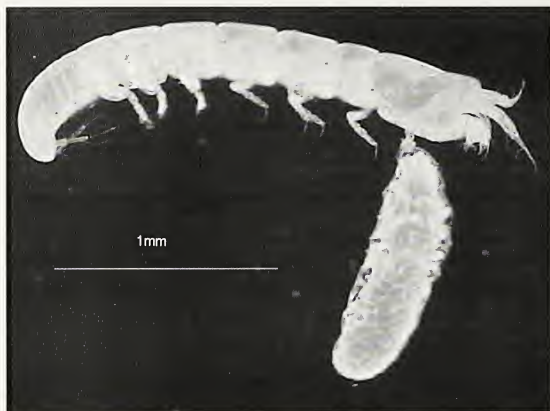
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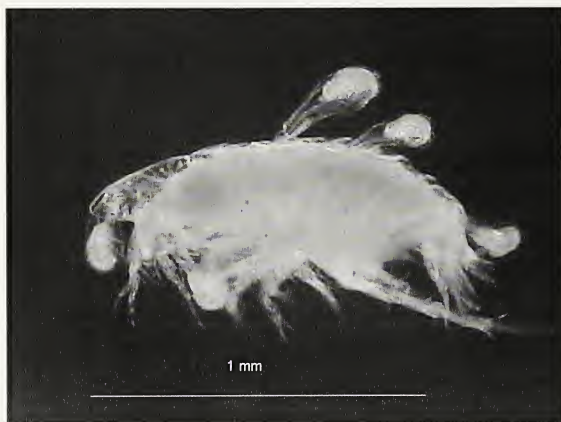
**Figure 1** – Ventral view of tanaid, *Akanthophoreus gracilis*, from Loch Creran, with tantulocarid, *Microdajus langi*, attached behind the gnathopod, showing brood pouch, with developing parthenogenic eggs/larvae.



**Figure 2** – Lateral view of tanaid, *Akanthophoreus gracilis*, from Northumberland coast, with tantulocarid, *Microdajus langi*, attached to base of the left gnathopod, showing brood pouch with developing parthenogenetic larvae.



**Figure 3** – Lateral left side view of juvenile amphipod, *Harpinia antennaria*, from the North Sea Miller Field, with five tantulocarids, *Amphitantulus harpiniacheres*, attached.



**Figure 4** – Lateral view of tantulocarid, *Amphitantulus harpiniacheres* attached to amphipod, *Harpinia antennaria*. The head shield is to the left (above arrow tip). The segmented larval trunk is clearly visible with minute appendages on the lower side. The large brood sac extends posteriorly and within it the outline of a single developing sexual female can be seen, curled up with its legs tucked underneath its tail.



**Figure 5** – Lateral view of tantulocarid, *Amphitantulus harpiniacheres* showing detail of the head shield (to the left) and the segmented larval trunk with minute legs and tail. An attachment thread can be seen running through the body to the brood sac containing a single developing sexual female.



**Figure 6** – Dorsal view of tantulocarid, *Amphitantulus harpiniacheres* showing the head shield (to the left) and the segmented larval trunk and tail. The larval trunk is visible through a transparent section of the brood pouch which extends posteriorly.

